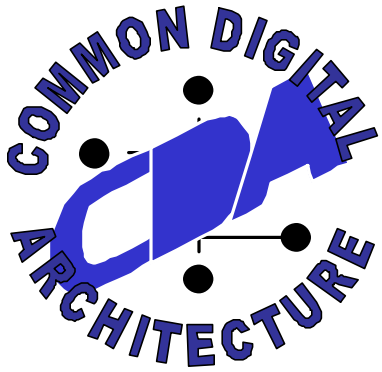
David Walthall
46 Test Wing
Eglin AFB, FL

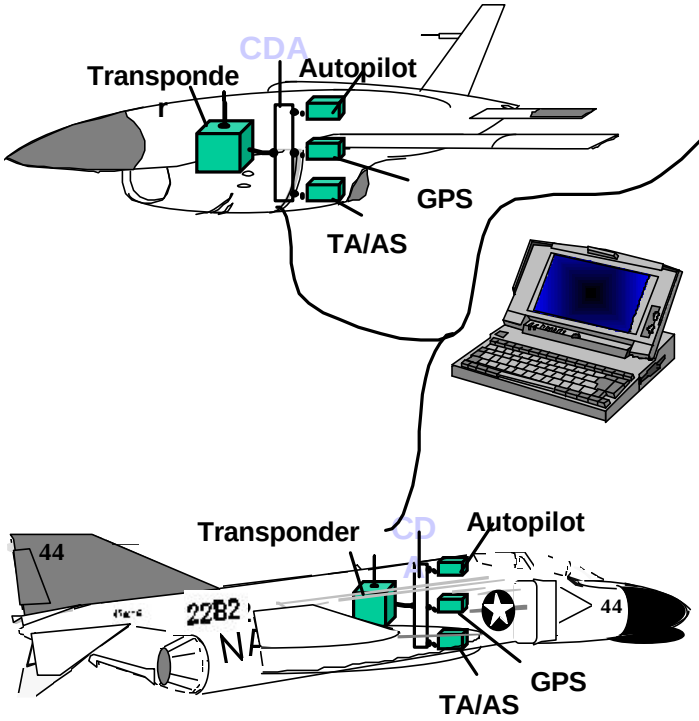
Outline

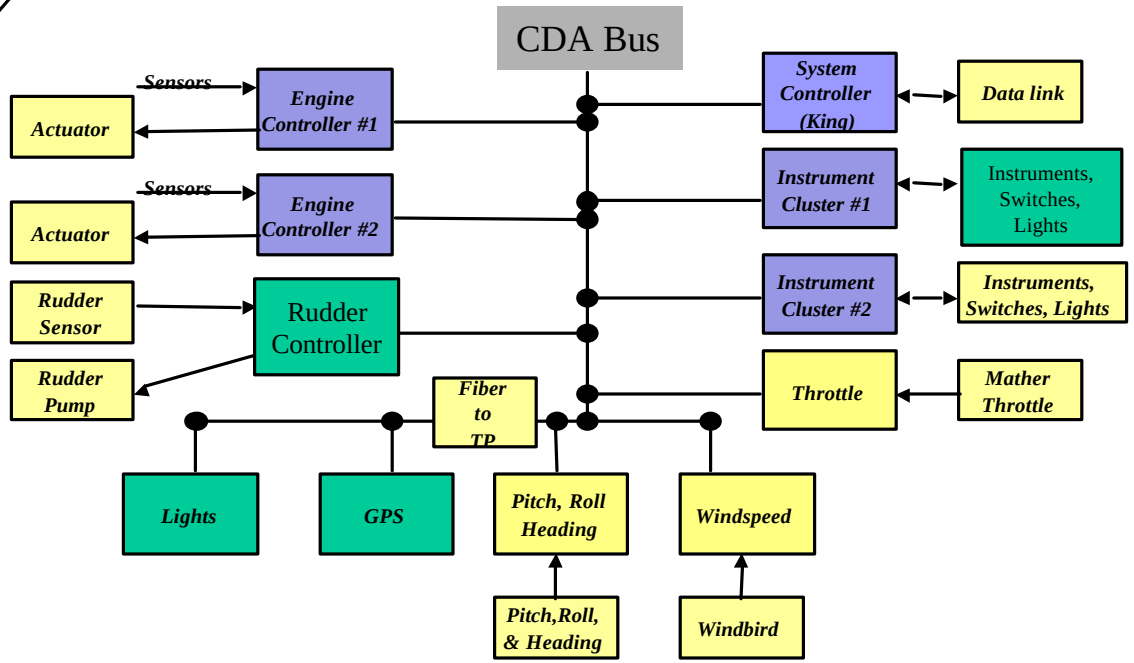


What Is Common Digital Architecture?
Why Is The Air Force Interested?
Current Air Force, Tri-Service, And Industry Activities
Accomplishments, Results, & Priorities
Summary

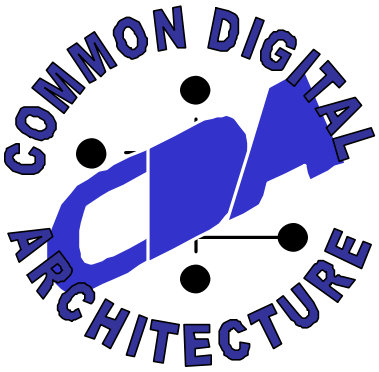
What is CDA?

Data Standard
Hardware Standard(s)
Technology Investigation



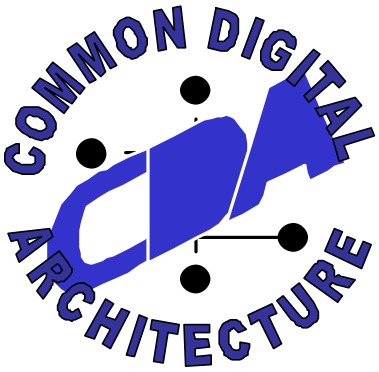


JTOC Direction



"Each Service is responsible for incorporating digital bus architecture and interfaces in all new target platforms for both Service unique programs and joint efforts."

CDA IS & NOT



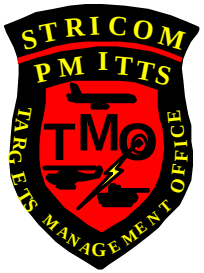
- CDA IS:
  - An Evaluation Of Technologies Which May Be Used To Meet OSD, JTOC and Air Force Objectives.
  - A Standard Or Standards Used To Network Target Vehicle Electronics And Common Support Equipment.
- CDA IS NOT:
  - A Mandate To Incorporate a CAN bus into all targets and subsystems.
  - The Government's Intention To Work In A Vacuum To Develop Point Solutions And Direct Contractors.

Synergy


GRDCS
AWFC-53WG
USAF-AFDTC
GULF RANGE


COMMON DIGITAL
ARCHITECTURE


NAWC
Weapons Division
NAVAL AIR WARFARE CENTER


STRICOM
PM ITTS
TMO
TARGETS MANAGEMENT OFFICE


AIR FORCE DEVELOPMENT TEST CENTER


AERIAL
TARGETS
PMA 208

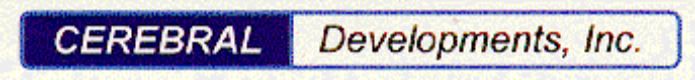

THE ART OF
DECEPTION
THREAT SYSTEMS


MICRO SYSTEMS, INC.


NORTHROP GRUMMAN
MARCONI

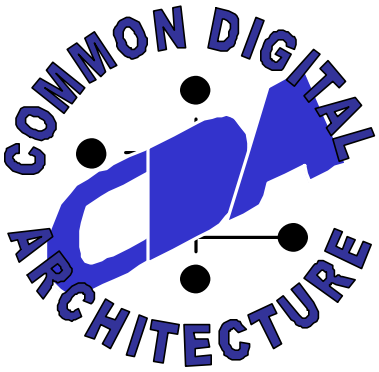

TRADITION OF EXCELLENCE


Non-DOD
DLA
AIR FORCE
Rapid Response To Critical System Requirements
R2
(R2CSR)
NAVY
ARMY


CEREBRAL
Developments, Inc.

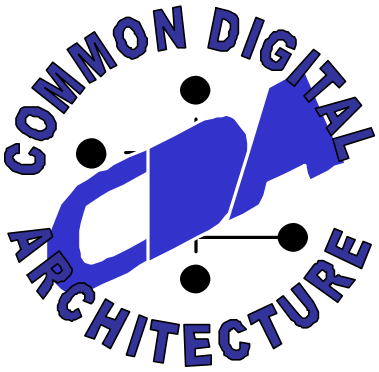

LEAR ASTRONICS

Air Force Requirements
(And Objectives)



- Improved Performance
- Lower Life Cycle Costs
- Easier Maintainable
- Faster Mission Prep & Turn-Around Time
- Promote Modern Technology In Digital Bus Architectures.
- Promote Miniaturization, “Plug and Play”, And Commonality.
- Reduce Unique Wiring Harnesses And Data Structures

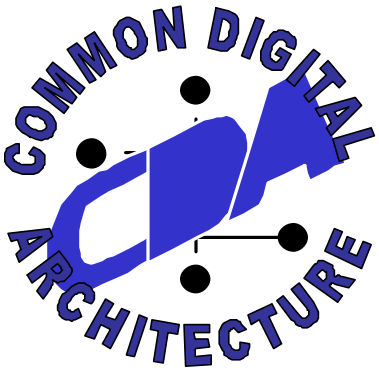
Why CDA Is Needed



- Proliferation Of Differing Targets
  - Air Force QF-4
  - Navy QF-4
  - MQM-107
  - BQM-34
  - BQM-74
  - Rotary Wing Target Systems
- Trend Is To Always Continue with Business as Usual
- All Target Development Is Independent
  - Little Software Reuse
  - CPU Speeds Can Compensate For Overhead (Windows 9X)

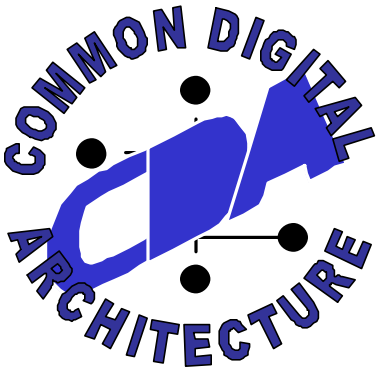
Why CDA Is Needed

(Air Force Example)



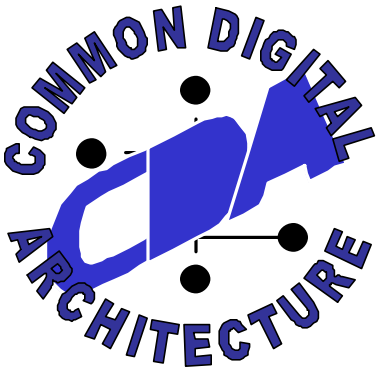
Drone	Description	Units	Minimum	Maximum	Bits
QF4	Baro Altitude	Feet	-2000.0	63536.0	15
	Radar Altitude	Feet	-50.0	65486.0	17
BQM-34	Baro Altitude	Feet	-500.0	75000.0	12
	Radar Altitude	Feet	0.0	5000.0	12
MQM-107	Baro Altitude	Feet	-2000.0	45000.0	12
	Radar Altitude	Feet	-833.0	2500.0	12

Why CDA Is Needed



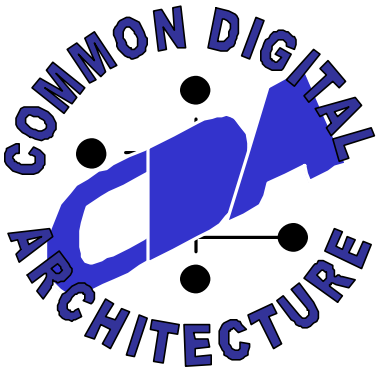
- Streamline Hardware
  - More Capable Targets and Payloads
  - Maximized Platform Parts Crossover
- Provide ‘Hooks’ to Reduce Integration Costs
- Provide smoother Technology Upgrade paths (hardware and software)
- Reduce Hardware Development Costs
- Reduce Drone’s Mission Prep Time

Why CDA Is Needed



- Streamline Software
  - Interoperability between Services
  - Commonality Of Data And Data link Structure Between Platforms
  - Promote GPS As The Common TSPI Source
  - Provide Reuse Software to Reduce Integration Costs

Current Air Force Efforts



- CDA Assessment
  - CRADA
    - Micro Systems, Inc.
  - SBIR
    - Cerebral Developments, Inc.
  - Rapid Response Contract
    - Study CDA Philosophy On Air Force Platform
      - Micro Systems, Inc.
      - Lear Siegler, Inc.

MICRO SYSTEMS, INC.

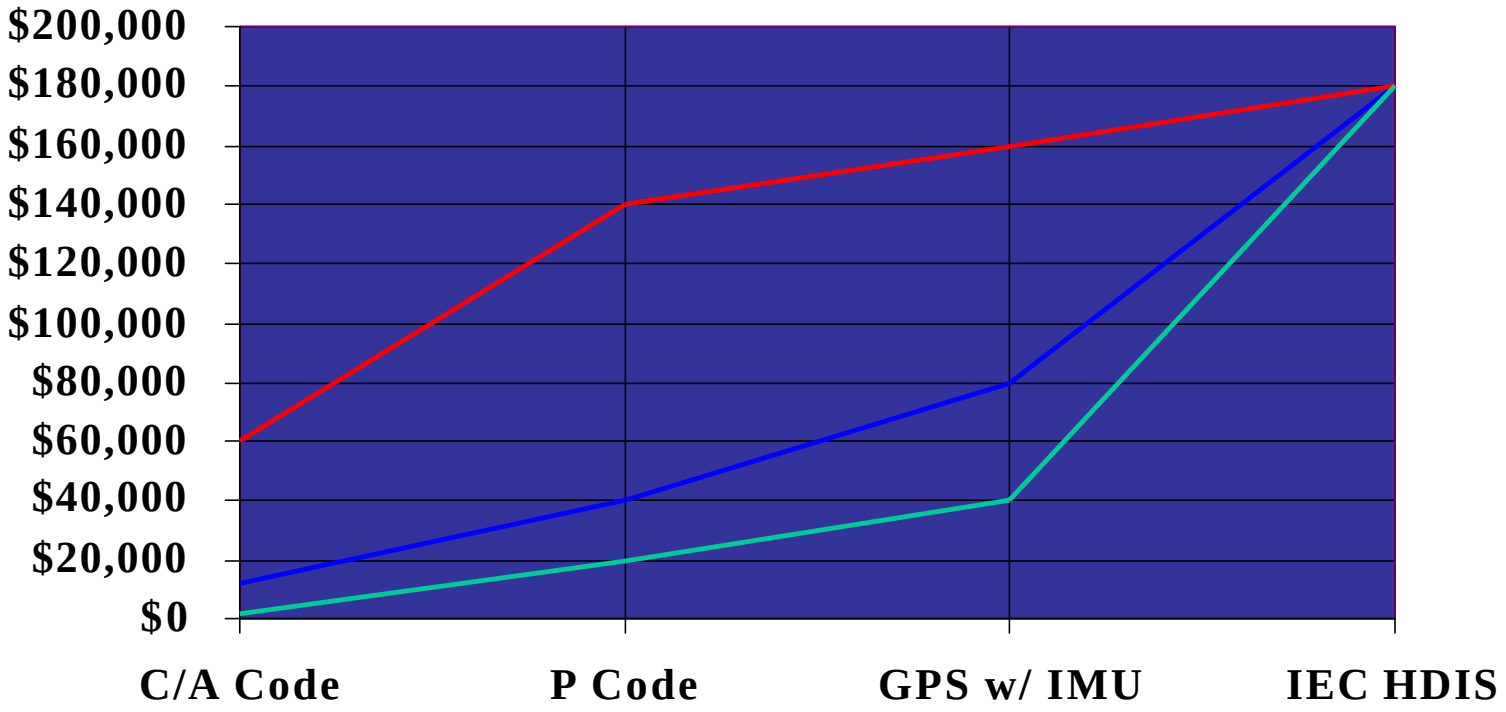
CEREBRAL Developments, Inc.

MARCONI

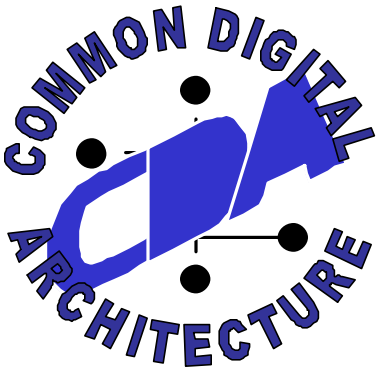
Why A CRADA?

- Evaluate Aspects Of Commercial C/A Code GPS In An Air Force QF-4 W.R.T. Legacy Of HDIS On QF-100
  - ICD Developed
  - Laboratory Hardware SW & HW Developed And Tested
  - Open Air RF Test
    - GPS RTCM-104 Inserted On GRDCS Uplink.
    - GPS TSPI Data Inserted On GRDCS Downlink.
  - Light Aircraft Flight Test
  - QF-4 Flight Test

Commercial GPS Capable Enough?

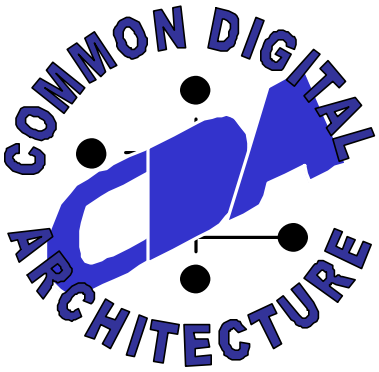


Why A SBIR?



- Study And Develop A Conceptual Multi-Function Integrated Target System
  - Consider The Whole Target As A System
  - Develop A Paper Architecture
  - Use Industry Standard Hardware, Software, And Node-Bussing Techniques

Why A R2 Contract?

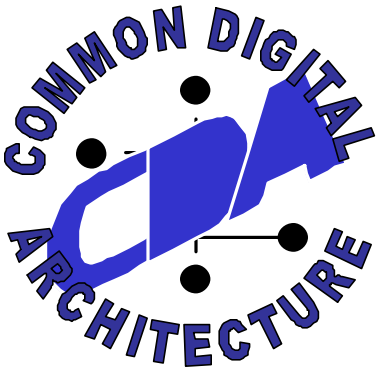


- Study The Advantages Of Adopting The CDA Philosophy Into Air Force Targets To Augment The CDA-101 Standard
  - CDA / CAN Philosophy Of Allowing New Participants On MIL1553 Bus In Real-time
  - CDA / CAN Incorporation Into Flare, Chaff, ECM, And Other Payloads
  - CDA Standardization Of Datalink Message Structures

Future Air Force Activities

- Determine Data To Be Placed On Aircraft Bus For Ancillary Equipment Usage.
- Modify GFE aircraft parts to evaluate CDA type nodes.
- Mock-Up An Air Force Platform As A CDA Candidate.

CDA Timeline



SBIR Report

Class 1

AF Report

BQM-74 System Test

BQM-74 Flight

MQM-107 Flight

CDA 101

MQM 107 Report

1553 Report

BQM-74 Qual

Workshop 3

BQM 74 Report

CDA IAU

FY97 | FY98 | FY99 | FY00

MQM-107 Qual

ST2000

QF-4 GPS Report

Workshop 2

ICC Brief

Compliance Report

AUVSI Brief

Class 2

AST Report

Workshop 1

Class 3

MQM 107 System Test

Class 4

QF-4 GPS Flight

CDA SPVI

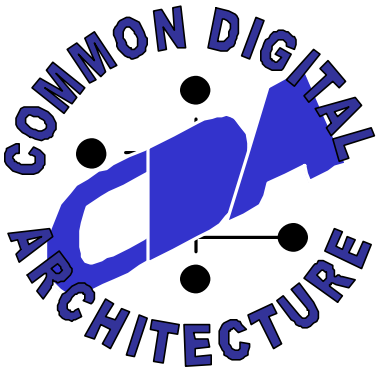
Workshop

CDA ULQ-21

Tri-Service Accomplishments

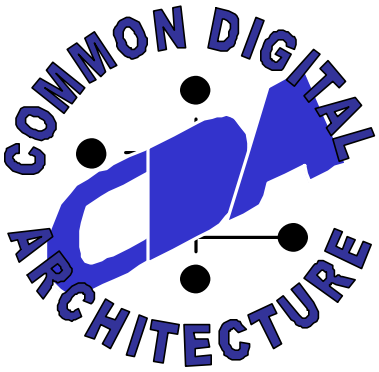
- Workshops
- CDA 101 Standard
- Seaborne Target Demonstration
- Gateway & Node Evaluations
- Platform Implementation Reports
  - BQM - 74
  - MQM-107

Findings To Date



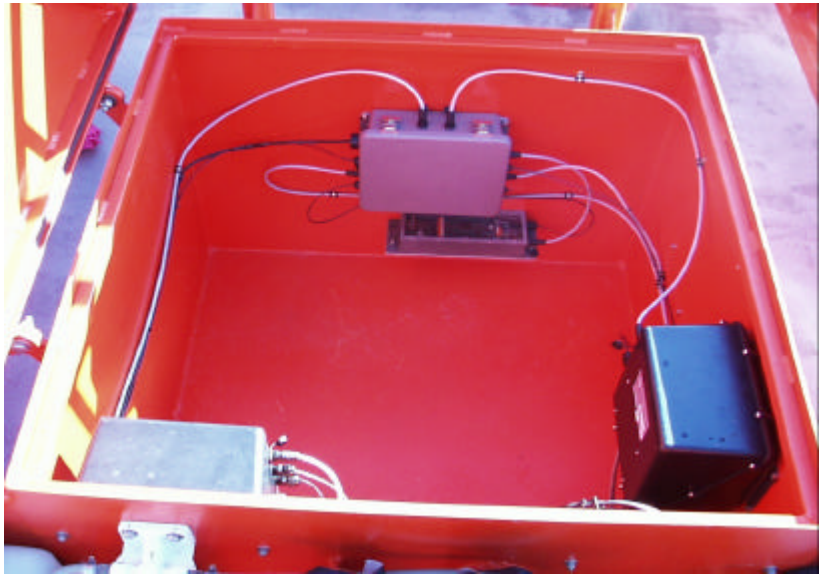
- **Industry Findings:**
  - Software Complexity To Increase By Factor Of 25
  - Signal Requirements Expected To Grow By 7-10% Annually
  - Need Improved Systems Diagnostics
- **Government Findings:**
  - 25% Reduction In Cost
  - Marked Increase In Flexibility
  - Easier Maintenance & Logistics
  - Reduction In Development Time

CDA Insertion Priorities

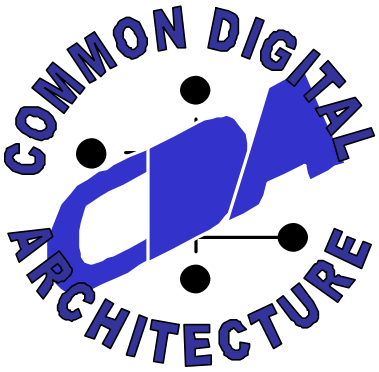


- New Targets Highest Priority
  - Joint Air Superiority Target
  - Joint Subscale Aerial Target
  - QST-35 follow-on
- Emerging Targets Best Current Opportunity
  - High Speed Maneuverable Seaborne Target
  - Anti-Ship Cruise Missile Target (ASCM, T-21)
- New Production of Existing/Continuing Targets Good Opportunity
  - MQM-107
  - BQM-74, BQM-74 follow-on
- Retrofit Not Considered Cost Effective

CDA Example



CDA Summary



- Adopts Commercial Standards And Products
- Applicable For Present And Future Targets
- OSD Supported
- Flexible And More Easily Tailored
- Reduced Development Cost
- Streamlines Hardware And Software Efforts
- Smoother Upgrade Paths
- Industry Buy-In
- Basic Components Readily Available
- Life Cycle Cost Savings
- Serves As Foundation For Achieving Service's Requirements
- CDA Concept Becoming Accepted